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Consumers Demand for Products with Animal Welfare Attributes: Evidence from Homescan Data for Scotland

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Abstract

Purpose**:** The purpose of this paper is to assess Scottish consumers' demand for animal welfare and organic pork. The paper also tried to answer the following questions: (1) Are animal-friendly pork and organic pork complements or substitutes (competing)? (2) What is the relationship between pork products with different animal welfare labels (i.e. "Freedom Food" pork versus "Specially Selected Pork")? (3) Does the demand for animal-friendly and organic pork vary with the level of deprivation of the area where consumers are living?

Design/methodology/approach: The dataset used in the analysis is the Kantar Worldpanel dataset for Scotland, which contains weekly data of food and drink purchases for consumption at home, covering the period 2006 to 2011. The panel is representative of the Scottish population and covers about 3,694 households. The linear version of the Almost Ideal Demand System was estimated. Then, the own- and the cross-price elasticities as well as the expenditure elasticities for the 22 food categories and products were computed.

Findings: The results indicate that when the price of animal-friendly pork increases, consumers decrease their consumption of this product and substitute it by organic pork or regular pork, especially in the case of fresh pork, bacon and sausages. It was found that products with different animal welfare accreditation are substitutes in the eyes of Scottish consumers and are, therefore, competing for the market share of animal-friendly foods. The results also show that the demand for animal-friendly pork is more elastic in the most deprived areas in Scotland.

Originality/value**:** To the best of the authors' knowledge, this is the first study that estimates the demand for conventional, animal-friendly and organic pork using a scanner data in Scotland and controlling for the variation by area of deprivation.

Keywords: Animal welfare, animal-friendly foods, organic foods, consumption

1. Introduction

Modern agricultural practices have increased the efficiency of food production, which has been reflected in lower prices for consumers. However, that increase in efficiency might have been to the detriment of ethical issues such as the way animals are treated in the production process, particularly in more intensive production systems. For instance, the aim of reducing production costs has led farmers to raise a large number of animals (e.g. pigs and hens) in limited spaces where their movement is restricted and their wellbeing is consequently decreased. Furthermore, to reduce the problems caused by the high stocking density of animals, such as tail biting for pigs and injurious pecking for hens, farmers have used practices such as confinement, tail docking and beak trimming that although they partially solve the problem, make animal wellbeing worse in other ways.

Animal advocacy groups have pressured policy makers to outlaw certain production practices (e.g., battery cages, gestation crates) and force farmers to use alternative production systems that are perceived to provide high animal welfare. As a result, the European Union (EU) recognised that animals are sentient beings and specified the minimum standards that ensure that they do not endure avoidable pain or suffering during the production process, the slaughtering and the transport. For instance, in January 2006, the Commission adopted a Community Action Plan for the protection and welfare of animals for the period 2006-2010 (European Commission, 2007). Furthermore, farmers who voluntarily adopted animal-friendly production standards were able to have their products labelled as animal-friendly to inform consumers that they were purchasing produce of high animal welfare standards.

Regardless of the approach used to address the issue of animal wellbeing (i.e. regulations or labelling), animal welfare improvements *may* result in higher production costs. A large number of

studies have been conducted, so far, to assess whether consumers[1] are willing to pay a price premium for animal-friendly products (e.g. Glass et al., 2005; Carlsson et al., 2007a; European Commission, 2007; Liljenstolpe, 2008; Chang et al., 2010; Lagerkvist and Hess, 2011; and Norwood and Lusk, 2011ab). The findings from these studies agreed on the fact that there is a large segment of consumers who are concerned about farm animal welfare and are willing to pay a price premium for animal-friendly food products.

Nonetheless, there is a growing number of empirical studies showing that animal-welfare minded consumers do not always walk their talk. In other words, empirical evidence shows that consumers' high interest in animal welfare is rarely translated into actual buying behaviour of animal-friendly products (Harper and Henson, 2001; Mayfield et al, 2007; Lusk et al, 2007; Verbeke, 2009; Miele, 2010). This disparity between what consumers say they are going to do and what they actually do at the point of purchase is commonly referred to as the attitude-behaviour gap or word-deed gap (Carrigan and Attalla, 2001; De Pelsmacker et al., 2005; Auger and Devinney, 2007).

Hypothetical bias has been mentioned in the literature as a potential explanation of the attitude-behaviour gap[2]. Hypothetical bias typically leads participants, in self-reported surveys and hypothetical economic experiments (e.g., contingent valuation and choice experiment), to overstate their willingness to pay (WTP) measures, as a result of the absence of a monetary cost that forces/incentivizes consumers to reveal their true preferences and WTP. (Lusk and Shogren, 2007)[3]. Despite its vulnerability to hypothetical bias, self-reported surveys and hypothetical economic experiments are still the most commonly used techniques to collect data on consumers' attitudes and WTP for farm animal

[1] These possible additional costs could also be paid by other stakeholders (e.g. farmers, processors, retailers, taxpayers).

[2] Furthermore, an increasing number of interesting theoretical models have been proposed, especially in social psychology, to explain the attitude-behaviour gap. This models include: techniques of neutralization (Gruber and Schlegelmilch, 2014), implementation intentions (Gollwitzer, 1999), actual behavioural control (Ajzen and Madden, 1986; Sheeran et al., 2003) and situational context (Russel, 1975).

[3] For instance, a meta-analysis of 29 experimental studies conducted by List and Gallet (2001) revealed that subjects on average overstate their preferences by a factor of 3 in self-reported surveys and hypothetical economic experiments.

welfare, mainly because they are easy and cheap to implement (Lusk and Shogren, 2007 and Norwood and Lusk, 2011).

Fortunately, the effect of hypothetical bias could be ruled out if consumer demand for animal welfare is assessed using data on actual consumers' purchases from grocery stores (e.g. scanner data). Nonetheless, only few peer-reviewed studies (Baltzer, 2004; Lusk, 2010; Chang et al., 2010; Tonsor and Olynk, 2011) used market data to explore issues related with consumers demand for animal-friendly food products. While the findings from these studies significantly contributed to the literature on animal welfare, our study varies with the papers of Baltzer (2004), Lusk (2010), Chang et al (2010) and Norwood and Lusk (2011) in three key ways.

First, we used *market data* on food and drink purchases for consumption at home to assess whether animal welfare is competing with other ethical food attributes such as organic. This is important because in retail stores animal-friendly food products are displayed and sold along with food products carrying other ethical attributes such as organic, local, fair trade etc. As a result, consumers might be indifferent between, for example, animal-friendly pork that is not organic and organic pork that is not labelled as animal friendly. Furthermore, some of the major UK retailers (i.e. Sainsbury's and Waitrose) recently started labelling organic meat as animal friendly, since animals raised in organic farms were found to enjoy a significant higher level of animal welfare than those raised in non-organic farms (D'Eath, 2014). Therefore, consumers concerned about farm animal welfare may opt to purchase animal-friendly organic meat, instead of animal-friendly non-organic meat, because it is animal and environmentally friendly. As a result of this substitution, the demand for non-organic foods labelled as animal friendly might lead to a decrease of non-organic farmers' interest and motivation to invest in improving their animals' welfare.

Second, in the Scottish market, two different labels ("Specially Selected Pork" (SSP) and "Freedom Food" (FF)) are used to inform Scottish consumers that the food is animal friendly.

"Specially Selected Pork" is accredited by the Scottish Society for Prevention of Cruelty to Animals (SSPCA) and is used on animal-friendly pork produced in Scotland. "Freedom Food" is accredited by the Royal Society for the Prevention of Cruelty to Animals (RSPCA) that operates in England and wales. The demand for SSP could benefit from the fact that this label is used on Scottish pork which is likely to be perceived by Scottish consumers as local pork. Although FF label is unlikely to be associated with Scottish products it could, however, be more familiar to Scottish consumers since it is has been used, in the Scottish market, on a wide range of animal products (e.g., eggs, chicken, beef, lamb). Therefore, another contribution of the paper is to assess the degree of substitution between these two labels for improved animal welfare.

Third, as aforementioned, improving animal welfare is likely to increase the retail price of animal-friendly products which in turn could decrease its availability and affordability. As a result, it is possible that the accessibility of the most deprived households to animal products will be negatively affected. Therefore, in difference with previous similar studies on animal welfare, we used market data to analyse whether the demand for animal-friendly and organic pork vary with the level of deprivation of the household.

To sum up, this paper tries to answer the following questions: (1) Is there a demand for animal-friendly and organic pork in Scotland? (2) Are animal-friendly pork and organic pork competing (i.e. substitutes)? (3) What is the relationship between pork products with different animal welfare labels (i.e. "Freedom Food" pork versus "Specially Selected Pork")? (4) Does the demand for animal-friendly and organic pork vary with the level of deprivation of the area where the household is located?

The remaining of this article is organized as follows. It proceeds with a review of the relevant literature on the demand for animal welfare. This section is followed by a description of the market data used and the underlying methodology employed in the econometric analysis. The results of the study are then presented in a subsequent section. The last section of the article provides a summary

of the results and discusses implications with regard to the findings. Limitations and directions of future research are also described.

2. Literature review

This section reviews recent literature on two topics: (1) consumers' attitudes toward farm animal welfare and related issues such as barriers to the demand of animal-friendly products and the profile of animal-welfare minded consumers, and (2) consumers' WTP for animal welfare and some empirical evidences on the attitude-behaviour gap.

Consumers' attitudes for animal welfare

The rich literature, on consumers' attitudes toward farm animal welfare, have showed an agreement among citizens in developed countries on the principle that farmed animals should be treated humanely and that cruelty towards them was unacceptable (e.g., Harper and Henson, 2001; Schroder and McEachem, 2004; Mayfield et al., 2007; Honkanen and Ottar Olsen, 2009; Norwood and Lusk, 2011; Kehlbacher et al., 2012). For example, according to a survey carried out in 25 European countries, animal welfare was highly recognized by the European citizens who attributed, on a scale from 1 to 10, an average of 7.8 to the importance of protecting farmed animals. Interestingly, the importance given to animal welfare was found to be higher in Scandinavian countries (e.g., Sweden (9.0), Finland (8.7) and Denmark (8.6)) and lower in other countries such as Lithuania (6.9) and Spain (6.9) (European Commission, 2007). Furthermore, consumers' concerns about the way animal are farmed were found to be higher for hens and pigs (Lagerkvist et al., 2006) and lower for farmed fish (Honkanen and Ottar Olsen, 2009). Despite the high consumers' interest for animal welfare, this attribute was seen as a less important meat choice attribute compared with price, quality, health benefits and product safety (Kanis et al., 2002; Lo and Matthews, 2002; Hutchins and Greenhalgh, 1997; Verbeke et al., 1999; Lusk et al.,

2007; Vanhonacker et al., 2010; Toma et al., 2011). For instance, Anderson (2001) found that when controlling for the effect of the food safety attribute, the effect of animal welfare on predicted purchase shares is relatively small.

Health, quality, food safety were mentioned by EU citizens as the main drivers of their demand for animal-friendly food products (European Commission, 2007). In the UK, British consumers were found to perceive animal-friendly meat as healthier (78 per cent), safer (75 per cent), better for the environment (72 per cent), more nutritional (72 per cent); and tastier (72 per cent) (Kehlbacher et al., 2012). Lack of information about production methods and animal welfare labels, lack of availability of animal-friendly products (e.g., in restaurant, small and rural shops and the limited availability of animal-friendly convenience foods), low trust in certification scheme, consumers' lack of belief in their ability to improve animal welfare through their purchases, the increased cost of 'animal-friendly' products and lack of time to look at labels have been mentioned in the literature as the main barriers to the purchase of animal-friendly food products (Harper and Henson, 2001; Kanis et al., 2003; Schroder and McEachem, 2004; European Commission, 2007; Nocella et al., 2010; Toma et al., 2010; Vanhonacker et al., 2010; Norwood and Lusk, 2011a; Lagerkvist et al., 2011).

When EU citizens were asked about who do they believe can best ensure that food products have been produced in an animal welfare-friendly way, they responded that farmers are the main responsible and should be helped by veterinarians in assuming this responsibility. They also revealed that governments should play the role of regulator and that animal protection organization should keep pressuring governments to improve animal well-being (European Commission, 2007). Lusk and Norwood (2008) found that the majority of US citizens believe that decision about animal welfare should be made by expert, rather than being based on public opinion (i.e., referendum), and that decision about animal welfare should be based on scientific measures of animal well-being, rather than on moral and ethical considerations.

Regarding the characteristics of animal-welfare minded consumers, a general profile can be drawn from the literature, although a wide variation can be observed. Generally speaking though, consumers of ethical foods are from more affluent households with highly educated members (Harper and Henson, 2001; Hill and Lynchehaun, 2002; Lagerkvist et al., 2006; Toma et al., 2010). Furthermore, women (unemployed consumers and students) were found to be the most (least) concerned about animal welfare when purchasing food products (European Commission, 2005). It is noteworthy that consumers' preferences and WTP for farm animal welfare were also found to be affected by their attitudes toward ethical food attributes and their life style (Norwood and Lusk, 2011; Kehlbacher et al., 2012).

Consumers' WTP for farm animal welfare

In addition to looking at consumers' attitudes towards animal welfare, many studies have focused on assessing consumers' WTP for animal-friendly food products. In line with their high interest in animal welfare, consumers were also found to be willing to pay a premium for animal-friendly food products. This premium was found to vary depending on the data collection method, population sampled and products considered in the study (Bennett, 1997; European Commission, 2005; Lusk et al., 2006; Lagerkvist et al., 2006; Carlsson et al., 2007ab; Liljenstolpe, 2008; Tonsor et al., 2009; Mørkbak et al., 2010; Norwood and Lusk, 2011a; Lagerkvist and Hess, 2011; Garcia et al., 2011; Kehlbacher et al., 2012).

For instance, results from a survey carried out for the European Commission in 25 European states showed that 57 per cent of European citizens revealed to be willing to pay a price premium for animal welfare-friendly food products of at least 5 per cent. The percentage of consumers who stated they are *not* willing to pay a price premium for animal welfare was low (less than 30 per cent) in Scandinavian countries, the UK and the Netherland but significantly higher in Hungary and Slovakia

(57 per cent) (European Commission, 2005). In the United States, consumers also revealed to be willing to a price premium for animal-friendly foods (Tonsor et al., 2009; Lusk et al., 2006; Norwood and Lusk, 2011a). For example, Norwood and Lusk (2011a) conducted a non-hypothetical experimental auction to measure consumers' willingness to pay for animal-friendly eggs and pork. They found that US consumers had stated to be willing to pay up to 141 and 112 per cent more for animal-friendly eggs and pork, respectively.

As mentioned in the introduction, there is empirical evidence that suggests that consumers show high interest in animal-friendly products when they are hypothetically asked about their attitudes for animal welfare, however, most of them do not seem to prioritize animal welfare considerations when purchasing food products in grocery stores. For example, Evans and Miele (2007a,b) found that 65 to 87 per cent of EU consumers (from Sweden, Norway, Italy, France, the Netherlands, the United Kingdom and Hungary) were interested in animal welfare. However, only 26 to 54 per cent of them revealed to actually think in animal welfare while buying meat in retail stores. Norwood and Lusk (2011a) stated that, in 2008, 63 per cent of Californian voters voted in favour of banning cage eggs. However, using retail scanner data of egg sales in California, the authors found that the expenditure on animal friendly eggs (e.g., cage-free eggs) represent only 10 per cent of all eggs expenditure. To answer the questions of this paper, we used a market dataset that reflects what consumers actually did at the point of purchase. The dataset and the methodology used to analyse the data are described in the next section.

3. Methodology

Data

The dataset used in the analysis was the Kantar Worldpanel dataset for Scotland (KWDS), which includes weekly records of all foods and beverages that were taken home from supermarkets and similar stores by 3,694 households during the period 2006 to 2011. The recruited households are representative of the Scottish population, however not all of them are observed every year as the dataset is a rotating panel (Hsiao, 2003) and households remain in the sample for a maximum of three years. Participating households are asked by the data company to record all purchases using barcode scanners and to send digital images of cash-register receipts to the company. The till receipts are used to provide information on prices and place of purchase. Formatted data gives therefore accurate quantity, expenditure and summary description information of every item purchased.

For each product, the dataset contains rich information on a number of attributes such as brand, manufacturer, origin of the product and whether the product is a private label, organic, gluten free, fair trade or animal-friendly product. The dataset also contains information on purchases, including the price paid, the quantity purchased by the household, the retail chain from which the product was purchased and the type of promotion used. Information on promotions is, however, incomplete. In addition, the dataset also includes household neighbourhood information (e.g., rural/urban, local authority) and socio-demographic characteristics for all the households (e.g., age, social class, level of deprivation, household size).

Almost Ideal Demand System (AIDS)

To answer the questions mentioned in the introduction, the own and cross-price elasticities as wells as expenditure elasticities have to be computed. The own-price elasticity is a measure of the percentage

change in the quantity demanded of product A "caused" by one per cent change in price of the same product. The cross price elasticity is a measure of the percentage change in the quantity demanded of product A "caused" by one per cent change in price of anther product (say product B). The expenditure elasticity is a measure of the percentage change in the quantity demanded of a product "caused" by one per cent change in the income. These different types of elasticities are computed based the output obtained from the estimation of a demand system.

In this paper, we estimated the linear version of the Almost Ideal Demand System (AIDS) which is the most widely used model of demand in the literature due its flexibility to include parametric restrictions required for consistency with economic theory (Deaton and Muellbauer, 1980). The AIDS model is generated from a cost minimization problem that defines the minimum expenditure necessary for a consumer to attain a specific level of utility at a given set of prices. The demand functions are obtained in share of consumer's budget spent on product i, in time t (i.e. w_{it}). The budget shares are obtained by logarithmic differentiation of the expenditure function with respect to prices. These shares are given by:

$$w_{it} = a_i + \sum_{j=1}^{n} \gamma_{ij} lnp_{jt} + \beta_i ln\left(\frac{x_t}{p_t}\right) \quad (1)$$

Where the shares are a function of the price of commodity j (p_{jt}) and the total expenditure x_t. a_i is the constant coefficient (i.e. intercept) in the *ith* share equation, γ_{ij} is the slope coefficient associated with the *jth* good in the *ith* share equation. It represents the change in the *ith* product's budget share with respect to a change in *jth* price with real expenditure held constant. The coefficient β_i represents the change in the *ith* product's budget share with respect to a change in real expenditures with price held constant. The analysis consists in estimating the parameters γ_{ij} and β_i which will be then used to

compute the conditional own- and cross-price elasticities as well as the expenditure elasticities for the 22 food categories and products considered in the analysis.

The price index p_t is used as a deflator to express the total expenditure in real terms. In the AIDS model, the price index is defined by:

(2) $$lnp_t = a_0 + \sum_{k=1}^{n} \alpha_k lnp_k + \frac{1}{2}\sum_{j=1}^{n}\sum_{k=1}^{n} \gamma_{jk} lnp_{jt}\, lnp_{kt}$$

Using a price index such as in (2) may complicate the estimation of the AIDS system due to its non-linearity. To simplify this, Stone's price index (p^*) is often used instead of p_t (and the AIDS model becomes the linear AIDS model), where

(3) $$lnp_t^* = \sum_{k=1}^{n} w_{kt} lnp_{kt}$$

In addition, to satisfy the theoretical constraints imposed by economic theory, three restrictions are imposed in the model: adding up, homogeneity of degree zero in prices and total expenditure, and Slutsky symmetry.

Adding up is satisfied if:

(4) $$\sum_i \alpha_i = 1 \qquad \sum_i \beta_i = 0 \qquad \sum_i \gamma_{ij} = 0$$

Homogeneity is satisfied if:

(5) $$\sum_j \gamma_{ij} = 0 \quad \forall i$$

Slutsky symmetry is satisfied if:

(6) $$\gamma_{ij} = \gamma_{ji}, \qquad \forall i, j$$

Multi-stage budgeting and the computation of unconditional elasticities

When considering a demand system with very disaggregated food categories, the number of parameters that need to be estimated becomes very large, which makes the estimation unfeasible due to the limited number of observations. One way to proceed is to consider a sub-system with only the food group of interest (e.g. pork product categories). The estimation of this sub-system produces 'conditional elasticities', which tend to be much higher than the unconditional elasticities (i.e. estimated when all the food categories are considered). To estimate the unconditional elasticities in the presence of limited number of observations the usual way to reduce the number of parameters is to impose weak separability and multi-stage budgeting assumptions. The former implies that goods can be divided into a number of separate groups, where a change in the price of a good in one group affects the demand for all commodities in another group in the same manner. The multi-stage budgeting implies that the total expenditure is first allocated among aggregated groups and subsequently the group expenditures are allocated between the goods in the group. (Edgerton, 1997).

In this study, the weak separability and three-stage budgeting are assumed (see Figure 1). Thus, the aggregated expenditure is first allocated among six groups of food products (i.e. beef, lamb, pork, chicken, fish, and other foods). In the second stage, the expenditure on pork is allocated among four groups of pork products (i.e. fresh pork, bacon, ham and sausages). In the third stage, the expenditure on each group of pork products is allocated among four pork products (i.e. regular, organic, Freedom Food, Specially Selected Pork).

Figure 1 goes here

We used Carpentier and Guyomard (2001)'s formulas to compute the unconditional cross-price elasticity ($\tilde{E}_{ij}$), as follows:

(7) $$E_i = E_{(G)i}E_G$$

(8) $$E_{ij} = E_{(G)ij} + w_{(H)j}\left(\frac{\delta_{GH}}{E_{(H)j}} + E_{GH}\right)E_{(G)i}E_{(H)j} + w_{(H)j}w_H E_G E_{(G)i}\left(E_{(H)i} - 1\right)$$

(9) $$\tilde{E}_{ij} = \tilde{E}_{(G)ij} + w_{(H)j}\tilde{E}_{GH}E_{(G)i}E_{(H)i}$$

where $E_G, E_{GH}$and $\tilde{E}_{GH}$ are the expenditure elasticity of group G and the own- and cross- price elasticities of group H, respectively. $E_{(G)i}$, $E_{(G)ij}$, and $\tilde{E}_{(G)ij}$ are the conditional expenditure elasticity and the conditional own- and cross-price elasticities of product i in group G with respect to the price product j, respectively. δ_{GH} is the Kronecker delta ($\delta_{GH} = 1$, for $G = H$ and zero otherwise); w_H is the share of group H in total expenditure and $w_{(H)j}$ is the share of commodity i in group H. Finally, $E_{(G)ij}$, and $\tilde{E}_{(G)ij}$ are both zero when i and j belong to different groups. The elasticities standard errors were computed using following the bootstrapping procedure implemented by Krinsky and Robb (1986).

Finally, to assess whether the demand for animal welfare varies with the level of deprivation of the area where the household is located, we also estimated the unconditional elasticities for two sub-samples of households: (1) households located in more deprived areas and (2) households located in less deprived areas. To identify the level of deprivation of the location of each household, we used the Scottish Index of Multiple Deprivation (SIMD). The SIMD is part of the Scottish Neighbourhood Statistics (SNS). It incorporates several different aspects of deprivation (e.g. household income, access to food and non-food products and services etc.), combining them into a single index. By identifying small areas where there are concentrations of multiple deprivation, the SIMD can be used to target

policies and resources at the places with greatest need. In this paper the sub-sample called SIMD 1 includes all the households living in the more deprived areas and the sub-sample named SIMD 2 includes all the households living in the less deprived areas.

4. Results

Demand for meat in Scotland

In terms of consumption, the results displayed in Table 1 indicate that Scottish consumers purchase pork more than any other type of meat. In fact, the annual consumption per capita of pork (including fresh pork, bacon, ham and sausages) is 11.18 kg, higher than the annual per capita consumption of beef, lamb, chicken and fish that was found to be 5.76 kg, 0.82 kg, 9.15 kg and 3.30 kg, respectively. As for the expenditure, Scottish consumers were found to spend more on pork than on the other types of meat. Within the pork category, the results show that Scots consume more bacon (3.81 kg) and sausages (3 kg) than ham (2.43 kg) and fresh pork (1.94 kg).

Table 1 goes here

To highlight the importance of the demand for animal-friendly pork compared with regular and organic pork, we computed the consumption and expenditure shares of these products. The results are displayed in Table 2. The results show that 94 per cent of the pork consumed in Scotland is regular pork and 93 per cent of the expenditure on pork products is spent on regular pork. Interestingly, the consumption of animal-friendly pork was found to be around 5.6 per cent of the total consumed pork, being significantly higher than the share of organic-pork consumption (0.02 per cent).

Furthermore, the results show some differences between the four pork categories. For instance, the consumption share of animal-friendly pork is significantly higher in the case of fresh pork and sausages than in the case of bacon and ham. These differences were also found in the expenditure shares. Our

own computation showed that organic fresh pork, organic bacon, organic ham and organic sausages are sold at significantly higher prices (£7.94; £10.04; £18.50; £7.79, respectively) than animal-friendly fresh pork, animal-friendly bacon and animal-friendly ham, animal-friendly sausages (£6.72; £8.81; £12.24; £4.81, respectively). As reported in previous studies, the higher price of organic pork may partially explain its lower demand by consumers compared animal-friendly pork (Soler et al., 2002; O'Donovan and McCarthy, 2002; Roitner-Schobesberger et al., 2008; Akaichi et al., 2012).

Table 2 goes here

Substitutability of organic, Freedom Food and Specially Selected pork

To find out whether organic and animal-friendly pork are competing and whether the variation of its prices affects the degree of their substitution, we computed the unconditional price elasticities. The results are presented in Tables 3 and 4.[4] The own-price elasticities displayed in Table 3 are all negative and statistically different from zero, indicating that an increase in the price of any of the food products considered in the analysis led to a decrease in the quantity consumed of the same product. The results also show that in general animal-friendly pork products (i.e. both Freedom Foods and Specially Selected Pork) are somewhat elastic. This implies that a decrease in the price of animal-friendly pork by one per cent will lead to an increase in its demand by more than one per cent (e.g. 1.9 per cent for Freedom Food fresh pork, 1.09 per cent for Freedom Food bacon, 3.02 per cent for SS bacon etc.) and vice versa. This is important because it shows that a decrease in the price of animal-friendly pork could boost its consumption. The demand for Specially Selected fresh pork and Freedom Food sausages were found to be inelastic, implying that a decrease in its prices by one per cent will result in an increase of its demand by less than one per cent. The results show that the demand for organic bacon, ham and

[4] Since the objective of the paper is to assess Scottish consumers demand for animal-friendly pork products, the results of the demand for the other meat products considered in the first stage (i.e. beef, lamb, chicken and fish) are not interpreted. Nonetheless, the consideration of those meat categories in the estimations is crucial for a reliable estimation of the elasticities (i.e. the effects of the different factors are not confounded).

sausages is inelastic. This indicates that an increase in the price of organic pork will decrease its consumption, but less than the decrease found for animal-friendly pork. Therefore, animal-friendly pork is more sensitive to price variation than organic pork.

The unconditional cross-price elasticities reported in Tables 4.1- 4.5 allow us to find out whether the pork products considered in the analysis are substitutes (i.e. an increase in the price of a product A will decrease its demand and increase the demand of a product B (its substitute)) or complements (i.e. an increase in the price of a product A will decrease its demand and the demand of product B (its complement)). Within the fresh pork category, the results show that organic and animal-friendly pork are substitutes. This implies that if the price of animal-friendly fresh pork increases, consumers will substitute it by organic fresh pork. As expected, the results show that the two animal-friendly fresh pork products (Freedom Food and Specially Selected) are also substitutes, implying that if the price of one of them increases consumers will substitute it by the other animal-friendly fresh pork product.

Table 4.2 goes here

As regard the bacon category, the results, displayed in Table 4.3, show that organic bacon is the substitute of Freedom Food bacon but is not a substitute of Specially Selected bacon. Furthermore, Freedom Food and Specially Selected bacon were found to be substitutes. Thus, an increase in the price of freedom food bacon will lead consumers to substitute it by organic bacon or Specially Selected bacon. Most importantly, the results show that animal friendly (Freedom Food and Specially Selected) bacon and regular bacon are substitutes. This implies that when the price of one of the two animal-friendly bacon increases, consumers might substitute it by regular bacon instead of buying other animal-friendly bacon or organic bacon. Therefore, Freedom Food bacon is competing not only with organic bacon but also with regular bacon.

Table 4.3 goes here

Regarding the ham category, results presented in Table 4.4 show that organic ham and regular ham are substitutes. Also, Freedom Food ham and Specially Selected harm were found to be substitutes. the results also show that, animal-friendly ham and organic ham are complements. Therefore, when the price of one of the two animal-friendly hams (say Freedom Food) increases, consumers are likely to substitute it only by the other animal-friendly ham.

Table 4.4 goes here

As regard the sausages category, the results reported in Table 4.5 show that consumers will substitute organic sausages by regular sausages or animal-friendly sausages if its price is increased. Also, we found that Freedom Food and Specially Selected sausages are substitutes. More interestingly, the results show that if the price of Specially Selected sausages increases, consumers could substitute it not only by the other animal-friendly sausages or organic sausages but also by regular sausages.

Table 4.5 goes here

Regarding the substitution across pork categories (e.g. substitution between fresh pork and bacon), we found that consumers do not generally consider different pork categories as substitutes. For example, when the price of animal-friendly fresh pork increases, consumers were found to not substitute it by bacon or ham. Nonetheless, the sausage category constitutes an exception. In fact, we found that if the price of Specially Selected sausages increases, consumers are likely to substitute it by Specially Selected bacon or ham.

The unconditional expenditure elasticities presented in Table 5 measure the sensitivity of the demand for the food products considered in the analysis to a variation in the household income. The results show that consumers perceive animal-friendly pork as “Normal” good. This indicates that an

increase in household income by one per cent increases the demand for animal-friendly pork by less than one per cent. Therefore, the low expenditure elasticities for animal-friendly pork indicate that increasing households' income (e.g. subsidizing animal-friendly pork) may not be an effective strategy to boost the demand of this type of ethical pork.

Table 5 goes here

Household's level of deprivation and the demand for pork in Scotland

The results corresponding to the per capita annual consumption of (expenditure on) meat in the less and the more deprived areas are displayed in Appendix 1. The results show that the consumption of (expenditure on) meat was significantly lower (at 1 per cent level of statistical significance) in the more deprived area. For example, the consumption of (expenditure on) pork was 68 (70) per cent less in the more deprived area than in the less deprived area. Interestingly, the results show that this difference in consumption and expenditure between the less and the more deprived areas was larger for Freedom Food pork than for Specially Selected pork. Particularly, we found that the consumption of (expenditure on) Freedom Food pork was 77 (78) per cent less in the more deprived area than in the less deprived area. Nonetheless, the consumption of (expenditure on) Specially Selected pork was found to be 58 (59) per cent less in the more deprived area than in the less deprived area. This could be explained by the fact that the price of Specially Selected pork is significantly lower (at 5 per cent level of statistical significance) than the price of Freedom Food pork.

It is noteworthy that the price for all meat product considered in the analysis were found to be significantly lower (at 1per cent level of statistical significance) in the more deprived area than in the less deprived area. Therefore, since the price does not seem to be the determining factor of the lower consumption of meat in the more deprived area, it will be interesting for future research studies to

identify the non-price factors (e.g. income, availability, lack of information etc.) that are behind the disparity of meat consumption between the more and the less deprived Scottish areas.

The results displayed in Appendices 2 to 5 represent the computed unconditional elasticities by level of deprivation. The results show that the demand for animal-friendly pork (Freedom Food and Specially Selected) is more elastic for the household living in the more deprived areas. This implies that an increase in the price of animal-friendly pork will lead to a higher decrease of its demand in the more deprived areas compared with the less deprived areas. As regard the cross-price elasticities displayed in Appendices 3.1 to 4.5, the results show that for both sub-samples Specially Selected and Freedom Food pork are substitutes (with the exception of fresh pork). Furthermore, we found that organic ham is considered a substitute of both Freedom Food and Specially Selected ham only by the households who are residing in the more deprived areas. Nonetheless, organic fresh pork is considered a substitute of both Freedom Food and Specially Selected fresh pork by the households who are residing in less deprived areas. The results for the expenditure elasticities by level of deprivation (Appendix 5) are mixed.

5. Discussion and conclusion

Overall, the results showed that there is a demand for animal-friendly pork and organic pork in Scotland. Although the demand for animal-friendly pork is low compared with regular pork, it was found to be significantly higher than the demand for organic pork. The high retail price of organic pork compared with conventional and animal-friendly pork is one of the major to the purchase and consumption of this type of products (Soler et al., 2002; O'Donovan and McCarthy, 2002; Roitner-Schobesberger et al., 2008; Akaichi et al., 2012). Interestingly, several studies found that consumers purchase organic animal products because they are more animal-friendly compared with non-organic animal products (e.g., Harper and Makatouni, 2002; Chen, 2007; Miele, 2010; Akaichi et al., 2012).

Furthermore, a study conducted by D'Eath et al. (2014) showed that animal kept in organic farm enjoy a higher level of welfare compared to animals raised in conventional farms. Therefore, labelling organic animal products as animal friendly could increase its demand by consumers due to its superiority in terms of animal welfare and environmental sustainability compared with non-organic animal products. Nonetheless, stakeholders interested in promoting animal welfare should be aware of the fact that organic and non-organic animal friendly foods are competing. As a result, increasing the demand for organic foods labelled as animal friendly might be in detriment of non-organic animal friendly foods which in turn might lead to a decrease of non-organic farmers' interest and motivation to invest in voluntarily improving their animals' welfare.

The results of the cross-price elasticities within each of the four pork categories (i.e. fresh pork, bacon, ham and sausages) showed that Freedom Food pork is a substitute of Specially Selected pork and vice versa. This result highlights the relationship of competition between these two animal welfare labels. In fact, any marketing strategy that targets to improve the acceptance and sales of one of the two brands can negatively affect the sales of the other brand. However, it is important to note that the demand of the pork labelled as Freedom Food is more sensitive to changes in the price of Specially Selected pork. Therefore, it is possible that the lower prices of Specially Selected pork compared with Freedom Food pork and the higher price sensitivity of Freedom Food pork are among the key drivers of the higher level of consumption of (and expenditure on) Specially Selected pork compared with Freedom Food pork. Another reason that could explain the higher demand for Specially Selected pork is its locality. In fact, the data used in this analysis showed that all the purchased Specially Selected pork is produced in Scotland although not all of them are labelled as Scottish[5]. Therefore, the demand for Specially Selected pork could be boosted if the product is labelled as Scottish ("local").

[5] All of them carry the label that proves that the product is accredited by the Scottish Society for Prevention of Cruelty to Animals (SSPCA).

Animal-friendly pork were also found to be competing with organic pork and in some cases with regular pork. This result highlights the importance of taking into account consumers' willing to substitute animal-friendly pork with organic pork if its price is increased, for example, to augment benefits or cover unexpected additional production or transaction costs. Furthermore, substituting animal-friendly pork by organic pork could also happen if consumers realize that organic pork is also animal-friendly, especially when compared with regular pork. Furthermore, the fact that Specially Selected pork is typically produced in Scotland could help to improve its competitiveness, in Scotland, with organic pork if it is labelled as Scottish. In fact, Lobb et al. (2006) and Weatherell et al. (2003) found that consumers in UK have positive preferences for local foods.

Furthermore, the results from the estimated expenditure elasticities showed that increasing households' income may not be the most effective strategy to boost animal-friendly pork consumption. In fact, the low expenditure elasticities for animal-friendly pork implies that an increase in households' income may not be fully spent on purchasing animal-friendly pork.

The higher price elasticity of animal-friendly pork in the more deprived area implies that an increase in the prices of pork certified as animal friendly, for example as a result of new and more restrict animal-welfare legislations, is likely to increase the disparity between the less and the more deprived area in terms of pork consumption. This disparity could be further increased if a new legislation on animal welfare results in an increase in the prices of the substitutes of animal-friendly pork (e.g., conventional pork) or banning its production altogether. In fact, in absence of affordable pork, more deprived consumers are likely to decrease their consumption of pork, which, in turn, will increase their food insecurity and widen the gap between poor and rich consumers. Therefore, economic analyses that generally precede the implementation of new legislations on animal welfare should control for the disparity between consumers living in the less and more deprived areas in terms of their sensitivity to price changes.

Finally, the discrepancies found between the most and the less deprived households show the importance of controlling for the heterogeneity among consumers when assessing their demand for animal-welfare in research studies. This suggestion has also been mentioned in previous studies (Lusk et al., 2003; Carlsson et al., 2007a, Liljenstolpe, 2008; Tonsor et al., 2009; Chang et al., 2010; Lagerkvist and Hess, 2011; and Norwood and Lusk, 2011ab) that showed that consumers' attitudes and socio-demographic characteristics are key factors of the demand for farm animal welfare.

Like any other empirical study, our work has some limitations that, in our opinion, must be mentioned and can be the basis of interesting idea for future studies. It is possible that animal welfare is not only competing with organic attribute but also with other food attributes that have been found to be of great interest for consumers such as the origin and the nutritional content of the product (e.g. local meat but not animal friendly versus non-local animal-friendly meat). Furthermore, The demand for animal-friendly meat could also be affected by extrinsic factors, that are also interesting to analyse in future studies, such as promotion, food scandals (e.g. the scandal horse meat in UK) and food legislations (e.g. the ban of gestation crate in UK, the tougher rules for tail docking etc.). It will also be interesting to assess whether labelling organic animal products as animal friendly could actually increase it competitive power and its demand by consumers, especially consumers who have preferences for both environmentally- and animal-friendly foods.

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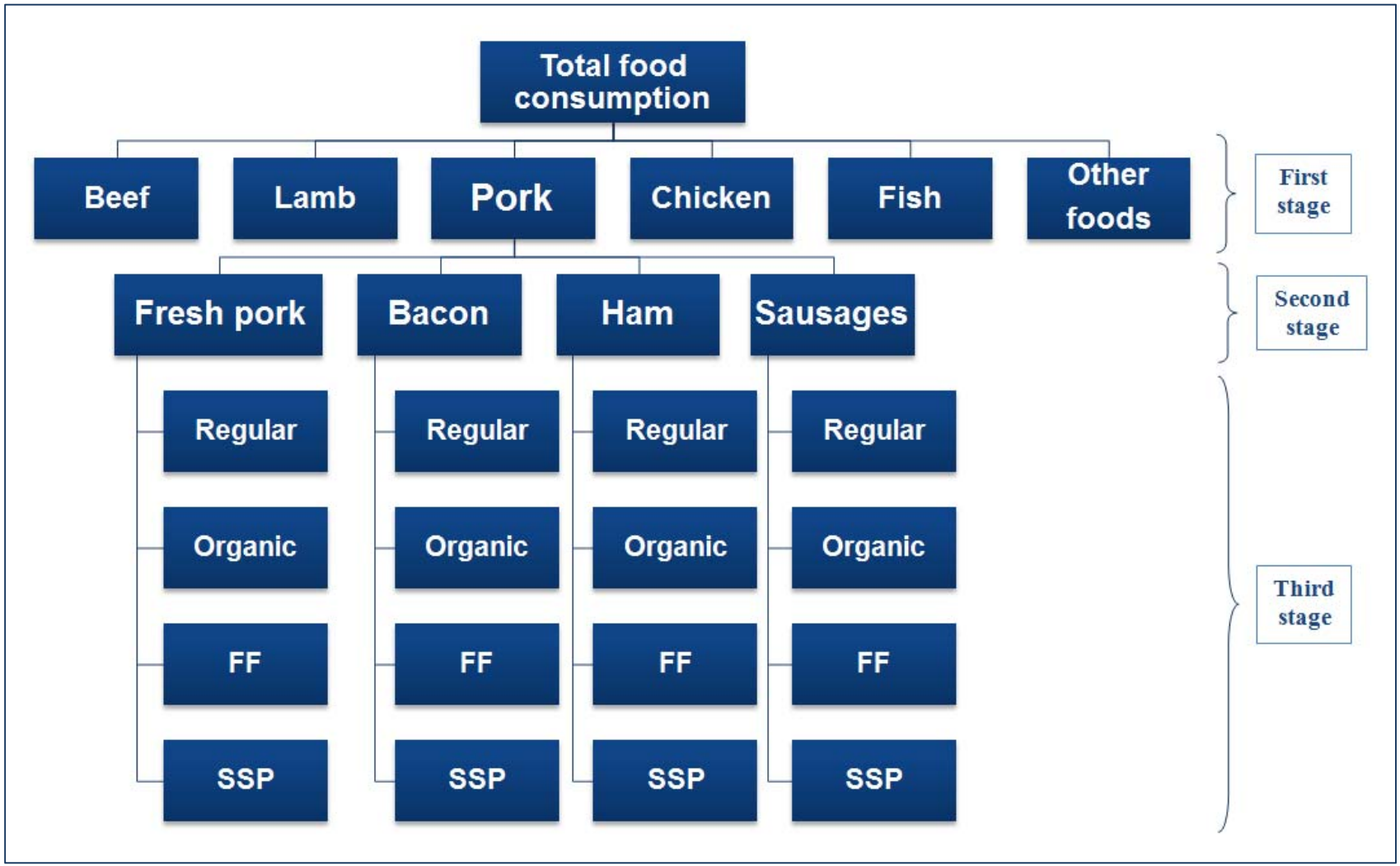
Figure 1: Partitioning of goods in the three-stage model



FF stands for Freedom Foods and SSP stands for Specially Selected Pork.

Table 1: Annual consumption and expenditure per capita

	Consumption				Expenditure			
	Mean	**Standard deviation**	**Minimum**	**Maximum**	**Mean**	**Standard deviation**	**Minimum**	**Maximum**
Beef	5.763	0.339	5.257	6.197	34.529	2.629	29.837	37.111
Lamb	0.820	0.097	0.655	0.934	5.980	0.414	5.256	6.364
Pork	11.181	0.235	10.909	11.549	62.691	5.160	55.061	67.765
Chicken	9.147	0.171	8.968	9.418	40.964	3.764	35.772	46.097
Fish	3.301	0.314	2.850	3.654	22.301	0.553	21.539	22.933
Fresh pork	1.938	0.136	1.708	2.063	9.554	1.103	7.684	10.431
Bacon	3.809	0.095	3.661	3.954	22.291	1.483	20.257	24.039
Ham	2.430	0.050	2.350	2.493	19.340	1.477	17.319	21.575
Sausages	3.004	0.075	2.937	3.102	11.506	1.261	9.801	12.850
Fresh pork- Regular	1.684	0.131	1.479	1.823	8.008	0.957	6.471	8.854
Fresh pork- Organic	0.008	0.004	0.001	0.011	0.061	0.035	0.009	0.092
Fresh pork- FF	0.007	0.008	0.000	0.016	0.054	0.059	0.000	0.113
Fresh pork- SSP	0.239	0.017	0.219	0.258	1.432	0.152	1.135	1.565
Bacon - Regular	3.770	0.106	3.605	3.940	22.060	1.520	20.041	23.895
Bacon cuts - Organic	0.006	0.004	0.002	0.012	0.055	0.033	0.021	0.112
Bacon - FF	0.007	0.005	0.001	0.015	0.086	0.059	0.015	0.188
Bacon - SSP	0.026	0.024	0.004	0.058	0.090	0.071	0.021	0.184
Ham - Regular	2.426	0.049	2.347	2.489	19.275	1.475	17.286	21.498
Ham - Organic	0.002	0.001	0.001	0.003	0.029	0.016	0.008	0.049
Ham - FF	0.002	0.001	0.000	0.004	0.035	0.023	0.000	0.059
Ham - SSP	0.000	0.000	0.000	0.001	0.002	0.005	0.000	0.012
Sausages - Regular	2.741	0.101	2.628	2.866	10.379	1.277	8.667	11.710
Sausages - Organic	0.006	0.003	0.003	0.011	0.046	0.031	0.017	0.099
Sausages - FF	0.027	0.017	0.001	0.045	0.152	0.097	0.005	0.260
Sausages - SSP	0.230	0.056	0.177	0.319	0.928	0.098	0.822	1.090

Source: Own elaboration based on Kantar World panel data

FF stands for Freedom Foods and SSP stands for Specially Selected Pork.

Table 2: Consumption and expenditure shares (proportions) of pork products (2006-2011)

	Consumption			Expenditure		
	Regular	**Organic**	**Animal friendly (FF + SSP)**	**Regular**	**Organic**	**Animal friendly (FF + SSP)**
Fresh pork	0.8686	0.0041	0.1273	0.8379	0.0067	0.1555
Bacon	0.9897	0.0015	0.0088	0.9895	0.0025	0.0080
Ham	0.9984	0.0007	0.0008	0.9966	0.0015	0.0019
Sausages	0.9122	0.0019	0.0859	0.9009	0.0042	0.0949
Total pork	0.9422	0.0020	0.0557	0.9312	0.0037	0.0650

Source: Own elaboration based on Kantar World panel data
FF stands for Freedom Foods and SSP stands for Specially Selected Pork

Table 3: Unconditional own-price elasticities

Product	Elasticities	
Beef	-0.87528	*
Lamb	-0.77433	*
Chicken	-0.98297	*
Fish	-1.20019	*
Other foods	-0.99489	*
Fresh pork- Regular	-1.29230	*
Fresh pork- Organic	-1.04022	*
Fresh pork- FF	-1.90551	*
Fresh pork- SSP	-0.34473	*
Bacon - Regular	-1.30642	*
Bacon cuts - Organic	-0.89874	*
Bacon - FF	-1.09117	*
Bacon - SSP	-3.02253	*
Ham - Regular	-1.29171	*
Ham - Organic	-0.95662	*
Ham - FF	-1.07202	*
Ham - SSP	-1.20952	*
Sausages - Regular	-1.11020	*
Sausages - Organic	-0.97783	*
Sausages - FF	-0.94225	*
Sausages - SSP	-1.00448	*

Source: Own elaboration based on Kantar Worldpanel data
FF stands for Freedom Foods and SSP stands for Specially Selected Pork.
Note: (*) Statistically significant at 5%

Table 4.1: Unconditional cross-price elasticities

	Beef		Lamb		Chicken		Fish		Other foods	
Beef	-0.8693	*	0.1500	*	-0.0137	*	-0.0001		0.0000	
Lamb	1.0563	*	-0.7736	*	-0.0327	*	-0.0001		0.0000	
Chicken	-0.0468	*	-0.0159	*	-1.2916	*	0.0002		0.0004	
Fish	-0.0378	*	-0.0128	*	0.0423	*	-1.0402	*	0.3711	*
Other foods	0.0022	*	0.0006	*	0.0860	*	0.4173	*	-1.9055	*
Fresh pork- Regular	-0.0144	*	-0.0049	*	-0.0842	*	-0.0141	*	0.0435	*
Fresh pork- Organic	-0.0704	*	-0.0239	*	-0.0786	*	-0.0003		0.0000	
Fresh pork- FF	-0.0191	*	-0.0064	*	-0.0213	*	-0.0001		0.0000	
Fresh pork- SSP	0.0140	*	0.0047	*	0.0157	*	0.0001		0.0000	
Bacon - Regular	-0.1856	*	-0.0627	*	-0.2069	*	-0.0008	*	0.0001	
Bacon cuts - Organic	-0.0482	*	-0.0164	*	0.0074	*	0.0000		0.0000	
Bacon - FF	-0.0142	*	-0.0049	*	0.0024	*	0.0000		0.0000	
Bacon - SSP	-0.0251	*	-0.0085	*	0.0038	*	0.0000		0.0000	
Ham - Regular	0.0895	*	0.0307	*	-0.0129	*	-0.0001		0.0000	
Ham - Organic	-0.0439	*	-0.0149	*	0.5379	*	0.0021	*	-0.0001	
Ham - FF	-0.0358	*	-0.0121	*	0.4375	*	0.0017	*	-0.0001	
Ham - SSP	-0.0406	*	-0.0137	*	0.4977	*	0.0019	*	-0.0001	
Sausages - Regular	-0.0437	*	-0.0148	*	0.5357	*	0.0021	*	-0.0001	
Sausages - Organic	-0.0152	*	-0.0082	*	0.0365	*	0.0001		0.0000	
Sausages - FF	0.0539	*	-0.0772	*	-0.0439	*	-0.0002		0.0000	
Sausages - SSP	0.0057	*	0.0004		0.0006	*	0.0000		0.0000	

Source: Own elaboration based on Kantar Worldpanel data
FF stands for Freedom Foods and SSP stands for Specially Selected Pork.
Note: (*) Statistically significant at 5%

Table 4.2: Unconditional cross-price elasticities

	Fresh pork Regular		Fresh pork Organic		Fresh pork FF		Fresh pork SSP	
Beef	-0.0006	*	-0.0461	*	0.0000		0.0000	
Lamb	-0.0014	*	-0.1100	*	0.0000		0.0000	
Chicken	-0.0120	*	-0.1760	*	-0.0001		0.0001	
Fish	-0.4256	*	-0.1423	*	-0.0001		0.0001	
Other foods	1.4739	*	0.0101	*	0.0000		0.0000	
Fresh pork- Regular	-0.3447	*	-0.0542	*	0.0000		0.0000	
Fresh pork- Organic	-0.0034	*	-1.3059	*	0.0005	*	0.0001	*
Fresh pork- FF	-0.0009		0.3342	*	-0.8987	*	0.1313	*
Fresh pork- SSP	0.0007		0.0537	*	0.1063	*	-1.0912	*
Bacon - Regular	-0.0090	*	-0.7699	*	0.0175	*	0.3232	*
Bacon cuts - Organic	0.0004		0.8002	*	0.0003		-0.0003	
Bacon - FF	0.0001		0.2360	*	0.0001		-0.0001	
Bacon - SSP	0.0002		0.4159	*	0.0002		-0.0002	
Ham - Regular	-0.0006	*	-1.5031	*	-0.0006	*	0.0006	
Ham - Organic	0.0235	*	0.1222	*	0.0001		0.0000	
Ham - FF	0.0191	*	0.0992	*	0.0000		0.0000	
Ham - SSP	0.0218	*	0.1131	*	0.0000		0.0000	
Sausages - Regular	0.0234	*	0.1217	*	0.0001		0.0000	
Sausages - Organic	0.0016	*	0.1224	*	0.0000		0.0000	
Sausages - FF	-0.0019	*	-0.1472	*	-0.0001		0.0001	
Sausages - SSP	0.0000		0.0021	*	0.0000		0.0000	

Source: Own elaboration based on Kantar Worldpanel data
FF stands for Freedom Foods and SSP stands for Specially Selected Pork.
Note: (*) Statistically significant at 5%

Table 4.3: Unconditional cross-price elasticities

	Bacon Regular		Bacon Organic		Bacon FF		Bacon SSP	
Beef	-0.0008	*	-0.0203	*	0.0000		0.0000	
Lamb	-0.0020	*	-0.0485	*	0.0000		0.0000	
Chicken	-0.0032	*	0.0113	*	0.0000		0.0000	
Fish	-0.0026	*	0.0095	*	0.0000		0.0000	
Other foods	0.0002		-0.0012	*	0.0000		0.0000	
Fresh pork- Regular	-0.0010	*	0.0037	*	0.0000		0.0000	
Fresh pork- Organic	-0.0054	*	0.5220	*	0.0001		0.0002	
Fresh pork- FF	0.0795	*	0.1408	*	0.0000		0.0001	
Fresh pork- SSP	1.1932	*	-0.1045		0.0000		0.0000	
Bacon - Regular	-3.0227	*	1.3758	*	0.0003	*	0.0006	*
Bacon cuts - Organic	0.0143	*	-1.2894	*	0.0002	*	0.0000	
Bacon - FF	0.0042	*	0.2651	*	-0.9566	*	0.3158	*
Bacon - SSP	0.0074	*	-0.0648		0.3017	*	-1.0720	*
Ham - Regular	-0.0268	*	0.5792	*	-0.0841	*	3.1362	*
Ham - Organic	0.0021	*	-0.0507	*	0.0000		0.0000	
Ham - FF	0.0017	*	-0.0413	*	0.0000		0.0000	
Ham - SSP	0.0020	*	-0.0469	*	0.0000		0.0000	
Sausages - Regular	0.0021	*	-0.0505	*	0.0000		0.0000	
Sausages - Organic	0.0022	*	0.0539	*	0.0000		0.0000	
Sausages - FF	-0.0027	*	-0.0649	*	0.0000		0.0000	
Sausages - SSP	0.0000		0.0009	*	0.0000		0.0000	

Source: Own elaboration based on Kantar Worldpanel data
FF stands for Freedom Foods and SSP stands for Specially Selected Pork.
Note: (*) Statistically significant at 5%

Table 4.4: Unconditional cross-price elasticities

	Ham Regular		Ham Organic		Ham FF		Ham SSP	
Beef	0.0000		-0.0209	*	0.0000		-0.0002	
Lamb	0.0000		-0.0498	*	-0.0001		-0.0005	
Chicken	0.0000		0.8722	*	0.0015	*	0.0080	*
Fish	0.0000		0.7041	*	0.0012	*	0.0064	*
Other foods	0.0000		-0.0479	*	-0.0001		-0.0004	
Fresh pork- Regular	0.0000		0.2673	*	0.0004		0.0024	*
Fresh pork- Organic	0.0000		0.0892	*	0.0002		0.0008	*
Fresh pork- FF	0.0000		0.0242	*	0.0000		0.0002	
Fresh pork- SSP	0.0000		-0.0178	*	0.0000		-0.0002	
Bacon - Regular	-0.0001		0.2353	*	0.0004		0.0021	*
Bacon cuts - Organic	0.0000		-0.0577	*	-0.0001		-0.0005	
Bacon - FF	-0.0046	*	-0.0170	*	0.0000		-0.0002	
Bacon - SSP	0.1650	*	-0.0300	*	0.0000		-0.0003	
Ham - Regular	-1.2095	*	0.1081	*	0.0002		0.0010	
Ham - Organic	0.0863	*	-1.1097	*	-0.0001		-0.0010	*
Ham - FF	0.0000		-0.0422	*	-0.9778	*	0.1003	*
Ham - SSP	0.0000		-0.0974	*	0.0209	*	-0.9423	*
Sausages - Regular	0.0000		-0.1092	*	0.0002		-0.0020	*
Sausages - Organic	0.0000		0.0554	*	0.0001		0.0005	
Sausages - FF	0.0000		-0.0667	*	-0.0001		-0.0006	*
Sausages - SSP	0.0000		0.0009	*	0.0000		0.0000	

Source: Own elaboration based on Kantar Worldpanel data
FF stands for Freedom Foods and SSP stands for Specially Selected Pork.
Note: (*) Statistically significant at 5%

Table 4.5: Unconditional cross-price elasticities

	Sausages Regular		Sausages Organic		Sausages FF		Sausages SSP	
Beef	-0.0017	*	-0.0241	*	0.0309	*	0.8236	*
Lamb	-0.0042	*	-0.0921	*	-0.3118	*	0.4347	*
Chicken	0.0741	*	0.1978	*	-0.0860	*	0.3038	*
Fish	0.0598	*	0.1599	*	-0.0693	*	0.2451	*
Other foods	-0.0041	*	-0.0102	*	0.0049	*	-0.0161	*
Fresh pork- Regular	0.0227	*	0.0606	*	-0.0264	*	0.0934	*
Fresh pork- Organic	0.0078	*	0.2965	*	-0.1290	*	0.4564	*
Fresh pork- FF	0.0021	*	0.0798	*	-0.0347	*	0.1233	*
Fresh pork- SSP	-0.0015	*	-0.0591	*	0.0260	*	-0.0915	*
Bacon - Regular	0.0205	*	0.7820	*	-0.3405	*	1.2006	*
Bacon cuts - Organic	-0.0048	*	0.2032	*	-0.0884	*	0.3131	*
Bacon - FF	-0.0014	*	0.0598	*	-0.0261	*	0.0922	*
Bacon - SSP	-0.0025	*	0.1057	*	-0.0460	*	0.1631	*
Ham - Regular	0.0089	*	-0.3811	*	0.1653	*	-0.5866	*
Ham - Organic	-0.0092	*	0.1848	*	-0.0804	*	0.2851	*
Ham - FF	0.0089	*	0.1504	*	-0.0654	*	0.2320	*
Ham - SSP	-0.0173	*	0.1709	*	-0.0744	*	0.2638	*
Sausages - Regular	-1.0042	*	0.1840	*	-0.0801	*	0.2839	*
Sausages - Organic	0.0046	*	-0.9774	*	0.2930	*	0.1786	*
Sausages - FF	-0.0056	*	0.8104	*	-1.1966	*	0.7678	*
Sausages - SSP	0.0001	*	0.0019	*	0.0030	*	-0.0157	*

Source: Own elaboration based on Kantar Worldpanel data
FF stands for Freedom Foods and SSP stands for Specially Selected Pork.
Note: (*) Statistically significant at 5%

Table 5: Unconditional expenditure elasticities

Product	Elasticities	
Beef	0.9020	*
Lamb	0.8163	*
Chicken	0.3272	*
Fish	0.2640	*
Other foods	-0.0173	*
Fresh pork- Regular	0.1004	*
Fresh pork- Organic	0.4911	*
Fresh pork- FF	0.1322	*
Fresh pork- SSP	-0.0988	*
Bacon - Regular	1.2949	*
Bacon cuts - Organic	0.3369	*
Bacon - FF	0.0992	*
Bacon - SSP	0.1754	*
Ham - Regular	-0.6309	*
Ham - Organic	0.3068	*
Ham - FF	0.2497	*
Ham - SSP	0.2839	*
Sausages - Regular	0.3055	*
Sausages - Organic	0.5282	*
Sausages - FF	0.9469	*
Sausages - SSP	1.0146	*

Source: Own elaboration based on Kantar Worldpanel data
FF stands for Freedom Foods and SSP stands for Specially Selected Pork.
Note: (*) Statistically significant at 5%

Appendix 2: Per capita annual consumption of meat per area of deprivation

	Quantity		Expenditure	
	SIMD1	SIMD2	SIMD1	SIMD2
Beef	3.56538	7.96062	20.46610	48.59190
Lamb	0.41081	1.22919	2.86557	9.09443
Chicken	5.21203	13.08197	22.12756	59.80044
Fish	1.74259	4.85941	10.19782	34.40418
Fresh pork	1.06923	2.80677	5.02057	14.08743
Bacon	2.21328	5.40472	12.36266	32.21934
Ham	1.44015	3.41985	10.85808	27.82192
Sausages	1.84736	4.16064	6.83157	16.18043
Fresh pork- Regular	0.93722	2.43078	4.26335	11.75265
Fresh pork- Organic	0.00367	0.01233	0.02564	0.09636
Fresh pork- FF	0.00257	0.01143	0.01943	0.08857
Fresh pork- SSP	0.12595	0.35205	0.71349	2.15051
Bacon - Regular	2.19779	5.34221	12.27646	31.84354
Bacon cuts - Organic	0.00212	0.00988	0.02027	0.08973
Bacon - FF	0.00323	0.01077	0.03738	0.13462
Bacon - SSP	0.01079	0.04121	0.03512	0.14488
Ham - Regular	1.43861	3.41339	10.83577	27.71423
Ham - Organic	0.00082	0.00318	0.00910	0.04890
Ham - FF	0.00064	0.00336	0.01207	0.05793
Ham - SSP	0.00083	0.00146	0.00152	0.00248
Sausages - Regular	1.69467	3.78733	6.21502	14.54298
Sausages - Organic	0.00141	0.01059	0.00854	0.08346
Sausages - FF	0.00806	0.04594	0.04431	0.25969
Sausages - SSP	0.14406	0.31594	0.56873	1.28727

Source: Own elaboration based on Kantar Worldpanel data
FF stands for Freedom Foods and SSP stands for Specially Selected Pork.
SIMD 1 includes all the households living in the more deprived areas.
SIMD 2 includes all the households living in the less deprived areas.

Appendix 2: Unconditional own-price elasticities

	SIMD1		SIMD2	
Beef	-0.2737	*	-1.0418	*
Lamb	-0.5998	*	-1.1015	*
Chicken	-0.8731	*	-1.0823	*
Fish	-1.0738	*	-0.6161	*
Other Foods	-0.9685	*	-0.9939	*
Fresh pork- Regular	-0.5691	*	-0.3409	*
Fresh pork- Organic	-1.5260	*	-1.3317	*
Fresh pork- FF	-2.0589	*	-1.7407	*
Fresh pork- SSP	-0.4521	*	-0.1670	*
Bacon - Regular	-0.6260	*	-0.7317	*
Bacon cuts - Organic	-1.4731	*	-1.4349	*
Bacon - FF	-1.7898	*	-1.4983	*
Bacon - SSP	-1.4924	*	-1.4185	*
Ham - Regular	0.3278	*	-0.1017	*
Ham - Organic	-2.3160	*	-1.5745	*
Ham - FF	-2.1608	*	-1.4824	*
Ham - SSP	-9.9497	*	-8.0326	*
Sausages - Regular	-0.7419	*	-0.8074	*
Sausages - Organic	-0.8798	*	-1.0365	*
Sausages - FF	-1.0157	*	-1.0443	*
Sausages - SSP	-0.9753	*	-0.9822	*

Source: Own elaboration based on Kantar Worldpanel data
FF stands for Freedom Foods and SSP stands for Specially Selected Pork.
Note: (*) Statistically significant at 5%
SIMD 1 includes all the households living in the more deprived areas.
SIMD 2 includes all the households living in the less deprived areas.

Appendix 3.1: Unconditional cross-price elasticities – SIMD1

	Beef		Lamb		Chicken		Fish		Other foods	
Beef	-0.2410	*	0.0431	*	-0.3057	*	-0.1385	*	0.6947	*
Lamb	0.3023	*	-0.5917	*	-0.1831	*	-0.1538	*	0.2093	*
Chicken	-0.2804	*	-0.0240	*	-0.8434	*	0.3492	*	1.1871	*
Fish	-0.2679	*	-0.0424	*	0.7364	*	-1.0606	*	-0.1660	*
Other foods	0.0201	*	0.0009	*	0.0375	*	-0.0025	*	-0.0879	*
Fresh pork- Regular	-0.0357	*	0.0823	*	-0.2723	*	0.2518	*	0.6662	*
Fresh pork- Organic	0.0195	*	-0.0398	*	0.1275	*	-0.1193	*	-0.3172	*
Fresh pork- FF	-0.0295	*	0.0701	*	-0.2319	*	0.2074	*	0.5588	*
Fresh pork- SSP	-0.0628	*	0.1438	*	-0.4761	*	0.4396	*	1.1621	*
Bacon - Regular	-0.0458	*	0.1074	*	-0.3534	*	0.3275	*	0.8640	*
Bacon cuts - Organic	0.0401	*	-0.0996	*	0.3288	*	-0.3206	*	-0.8190	*
Bacon - FF	-0.0658	*	0.1602	*	-0.5314	*	0.4927	*	1.2914	*
Bacon - SSP	-0.1171	*	0.2776	*	-0.8910	*	0.8233	*	2.1713	*
Ham - Regular	-0.0068	*	0.0170	*	-0.0570	*	0.0530	*	0.1383	*
Ham - Organic	-0.0186	*	0.0460	*	-0.1535	*	0.1409	*	0.3735	*
Ham - FF	-0.0338	*	0.0949	*	-0.3142	*	0.2935	*	0.7682	*
Ham - SSP	0.0473	*	-0.0996	*	0.3371	*	-0.3158	*	-0.8255	*
Sausages - Regular	-0.0485	*	0.1130	*	-0.3734	*	0.3458	*	0.9119	*
Sausages - Organic	-0.0392	*	0.0988	*	-0.3236	*	0.3010	*	0.8063	*
Sausages - FF	-0.0409	*	0.0977	*	-0.3196	*	0.2928	*	0.7771	*
Sausages - SSP	-0.0483	*	0.1125	*	-0.3714	*	0.3438	*	0.9070	*

Source: Own elaboration based on Kantar Worldpanel data
FF stands for Freedom Foods and SSP stands for Specially Selected Pork.
Note: (*) Statistically significant at 5%
SIMD 1 includes all the households living in the more deprived areas.

Appendix 3.2: Unconditional cross-price elasticities – SIMD1

	Fresh pork Regular		Fresh pork Organic		Fresh pork FF		Fresh pork SSP	
Beef	-0.0076	*	0.0000		0.0000		-0.0023	*
Lamb	0.1227	*	-0.0004		0.0005		0.0362	*
Chicken	-0.0532	*	0.0002		-0.0002		-0.0157	*
Fish	0.1037	*	-0.0003		0.0004		0.0305	*
Other foods	0.0041	*	0.0000		0.0000		0.0012	*
Fresh pork- Regular	-0.5641	*	0.0097	*	0.0112	*	-0.1108	*
Fresh pork- Organic	1.5187	*	-1.5260	*	-0.0898	*	0.4001	*
Fresh pork- FF	2.6382	*	-0.1357	*	-2.0590	*	-0.9890	*
Fresh pork- SSP	-0.6769	*	0.0158	*	-0.0259	*	-0.4521	*
Bacon - Regular	-0.0875	*	0.0002		-0.0003		-0.0260	*
Bacon cuts - Organic	0.0850	*	-0.0002		0.0003		0.0251	*
Bacon - FF	-0.1302	*	0.0004		-0.0005		-0.0388	*
Bacon - SSP	-0.2205	*	0.0006	*	-0.0008	*	-0.0654	*
Ham - Regular	0.0365	*	-0.0001		0.0001		0.0100	*
Ham - Organic	0.1039	*	-0.0003		0.0003		0.0288	*
Ham - FF	0.2066	*	-0.0005		0.0006	*	0.0570	*
Ham - SSP	-0.2075	*	0.0005		-0.0006	*	-0.0568	*
Sausages - Regular	0.0936	*	-0.0003		0.0003		0.0253	*
Sausages - Organic	0.0772	*	-0.0002		0.0002		0.0206	*
Sausages - FF	0.0782	*	-0.0002		0.0002		0.0210	*
Sausages - SSP	0.0931	*	-0.0003		0.0003		0.0252	*

Source: Own elaboration based on Kantar Worldpanel data
FF stands for Freedom Foods and SSP stands for Specially Selected Pork.
Note: (*) Statistically significant at 5%
SIMD 1 includes all the households living in the more deprived areas.

Appendix 3.3: Unconditional cross-price elasticities – SIMD1

	Bacon Regular		Bacon Organic		Bacon FF		Bacon SSP	
Beef	-0.0279	*	0.0000		-0.0001		-0.0002	
Lamb	0.4587	*	-0.0007	*	0.0019	*	0.0035	*
Chicken	-0.1976	*	0.0003		-0.0008	*	-0.0015	*
Fish	0.3860	*	-0.0006	*	0.0016	*	0.0028	*
Other foods	0.0153	*	0.0000		0.0001		0.0001	
Fresh pork- Regular	-0.2510	*	0.0004		-0.0010	*	-0.0018	*
Fresh pork- Organic	0.1113	*	-0.0002		0.0005		0.0008	*
Fresh pork- FF	-0.1979	*	0.0003		-0.0008	*	-0.0014	*
Fresh pork- SSP	-0.4372	*	0.0007	*	-0.0018	*	-0.0032	*
Bacon - Regular	-0.6099	*	0.0037	*	0.0021	*	0.0000	
Bacon cuts - Organic	2.1387	*	-1.4731	*	-0.0554	*	-0.0479	*
Bacon - FF	0.8700	*	-0.0376	*	-1.7899	*	0.0545	*
Bacon - SSP	-0.0493	*	-0.0273	*	0.0455	*	-1.4922	*
Ham - Regular	-0.2432	*	0.0004		-0.0010	*	-0.0018	*
Ham - Organic	-0.6634	*	0.0012	*	-0.0026	*	-0.0050	*
Ham - FF	-1.3279	*	0.0023	*	-0.0052	*	-0.0099	*
Ham - SSP	1.4730	*	-0.0025	*	0.0059	*	0.0109	*
Sausages - Regular	0.1230	*	-0.0002		0.0003		0.0011	*
Sausages - Organic	0.1075	*	-0.0002		0.0003		0.0009	*
Sausages - FF	0.1055	*	-0.0002		0.0003		0.0009	*
Sausages - SSP	0.1223	*	-0.0002		0.0003		0.0011	*

Source: Own elaboration based on Kantar Worldpanel data
FF stands for Freedom Foods and SSP stands for Specially Selected Pork.
Note: (*) Statistically significant at 5%
SIMD 1 includes all the households living in the more deprived areas.

Appendix 3.4: Unconditional cross-price elasticities – SIMD1

	Ham Regular		Ham Organic		Ham FF		Ham SSP	
Beef	-0.0037	*	0.0000		0.0000		0.0000	
Lamb	0.0640	*	0.0002		0.0004		-0.0001	
Chicken	-0.0281	*	-0.0001		-0.0002		0.0000	
Fish	0.0550	*	0.0001		0.0004		-0.0001	
Other foods	0.0022	*	0.0000		0.0000		0.0000	
Fresh pork- Regular	0.0925	*	0.0002		0.0006	*	-0.0001	
Fresh pork- Organic	-0.0381	*	-0.0001		-0.0002		0.0000	
Fresh pork- FF	0.0696	*	0.0002		0.0005		-0.0001	
Fresh pork- SSP	0.1594	*	0.0004		0.0010	*	-0.0001	
Bacon - Regular	-0.2155	*	-0.0005		-0.0014	*	0.0002	
Bacon cuts - Organic	0.2184	*	0.0005		0.0014	*	-0.0002	
Bacon - FF	-0.3249	*	-0.0008	*	-0.0020	*	0.0004	
Bacon - SSP	-0.5386	*	-0.0012	*	-0.0034	*	0.0006	*
Ham - Regular	0.3306	*	0.0025	*	0.0043	*	0.0013	*
Ham - Organic	2.9427	*	-2.3160	*	0.2656	*	0.0221	*
Ham - FF	3.7510	*	0.1938	*	-2.1608	*	0.0486	*
Ham - SSP	7.4520	*	0.1053	*	0.3183	*	-9.9497	*
Sausages - Regular	-0.4501	*	-0.0010	*	-0.0028	*	0.0005	
Sausages - Organic	-0.3916	*	-0.0009	*	-0.0025	*	0.0004	
Sausages - FF	-0.3809	*	-0.0009	*	-0.0024	*	0.0004	
Sausages - SSP	-0.4477	*	-0.0010	*	-0.0028	*	0.0005	

Source: Own elaboration based on Kantar Worldpanel data
FF stands for Freedom Foods and SSP stands for Specially Selected Pork.
Note: (*) Statistically significant at 5%
SIMD 1 includes all the households living in the more deprived areas.

Appendix 3.5: Unconditional cross-price elasticities – SIMD1

	Sausages Regular		Sausages Organic		Sausages FF		Sausages SSP	
Beef	-0.0148	*	0.0000		-0.0001		-0.0013	*
Lamb	0.2422	*	0.0003		0.0016	*	0.0219	*
Chicken	-0.1048	*	-0.0001		-0.0007	*	-0.0095	*
Fish	0.2046	*	0.0003		0.0013	*	0.0185	*
Other foods	0.0081	*	0.0000		0.0001		0.0007	*
Fresh pork- Regular	0.1315	*	0.0002		0.0007	*	0.0131	*
Fresh pork- Organic	-0.0557	*	-0.0001		-0.0003		-0.0056	*
Fresh pork- FF	0.1062	*	0.0002		0.0006	*	0.0106	*
Fresh pork- SSP	0.2303	*	0.0003		0.0012	*	0.0229	*
Bacon - Regular	0.0604	*	0.0001		0.0003		0.0066	*
Bacon cuts - Organic	-0.0580	*	-0.0001		-0.0003		-0.0063	*
Bacon - FF	0.0895	*	0.0002		0.0004		0.0098	*
Bacon - SSP	0.1529	*	0.0003		0.0007	*	0.0166	*
Ham - Regular	-0.2536	*	-0.0004		-0.0016	*	-0.0238	*
Ham - Organic	-0.6839	*	-0.0010	*	-0.0042	*	-0.0643	*
Ham - FF	-1.3912	*	-0.0020	*	-0.0084	*	-0.1306	*
Ham - SSP	1.5246	*	0.0021	*	0.0093	*	0.1432	*
Sausages - Regular	-0.7346	*	0.0003		0.0027	*	0.0265	*
Sausages - Organic	0.1836	*	-0.8797	*	-0.0104	*	0.0832	*
Sausages - FF	0.3952	*	-0.0023	*	-1.0157	*	0.0230	*
Sausages - SSP	0.2696	*	0.0015	*	0.0016	*	-0.9737	*

Source: Own elaboration based on Kantar Worldpanel data
FF stands for Freedom Foods and SSP stands for Specially Selected Pork.
Note: (*) Statistically significant at 5%
SIMD 1 includes all the households living in the more deprived areas.

Appendix 4.1: Unconditional cross-price elasticities – SIMD2

	Beef		Lamb		Chicken		Fish		Other foods	
Beef	-1.0269	*	-0.0783	*	-0.0764	*	-0.2172	*	0.9978	*
Lamb	-0.4060	*	-1.0939	*	0.7800	*	-0.7143	*	0.6108	*
Chicken	-0.0617	*	0.1214	*	-1.0460	*	0.1010	*	1.0342	*
Fish	-0.2962	*	-0.1878	*	0.1705	*	-0.6049	*	0.3226	*
Other foods	0.0272	*	0.0032	*	0.0350	*	0.0065	*	-0.0997	*
Fresh pork- Regular	0.1009	*	0.1050	*	-0.0849	*	0.1126	*	0.4066	*
Fresh pork- Organic	0.0029	*	0.0056	*	-0.0049	*	0.0081	*	0.0241	*
Fresh pork- FF	-0.1089	*	-0.1127	*	0.0915	*	-0.1189	*	-0.4286	*
Fresh pork- SSP	0.0693	*	0.0718	*	-0.0584	*	0.0766	*	0.2788	*
Bacon - Regular	0.1966	*	0.2054	*	-0.1644	*	0.2183	*	0.7911	*
Bacon cuts - Organic	0.0724	*	0.0793	*	-0.0657	*	0.0844	*	0.3058	*
Bacon - FF	0.2339	*	0.2472	*	-0.1979	*	0.2630	*	0.9558	*
Bacon - SSP	0.3444	*	0.3631	*	-0.2933	*	0.3907	*	1.3851	*
Ham - Regular	0.0457	*	0.0474	*	-0.0380	*	0.0503	*	0.1829	*
Ham - Organic	-0.1754	*	-0.1811	*	0.1453	*	-0.1891	*	-0.6942	*
Ham - FF	0.1659	*	0.1702	*	-0.1392	*	0.1814	*	0.6598	*
Ham - SSP	-0.0958	*	-0.1015	*	0.0853	*	-0.1119	*	-0.3976	*
Sausages - Regular	0.2144	*	0.2244	*	-0.1795	*	0.2387	*	0.8630	*
Sausages - Organic	0.0754	*	0.0794	*	-0.0625	*	0.0831	*	0.3078	*
Sausages - FF	0.2158	*	0.2263	*	-0.1815	*	0.2409	*	0.8726	*
Sausages - SSP	0.2141	*	0.2242	*	-0.1793	*	0.2384	*	0.8621	*

Source: Own elaboration based on Kantar Worldpanel data
FF stands for Freedom Foods and SSP stands for Specially Selected Pork.
Note: (*) Statistically significant at 5%
SIMD 2 includes all the households living in the less deprived areas

Appendix 4.2: Unconditional cross-price elasticities – SIMD2

	Fresh pork Regular		Fresh pork Organic		Fresh pork FF		Fresh pork SSP	
Beef	0.0249	*	0.0000		-0.0002		0.0031	*
Lamb	0.1343	*	0.0001		-0.0011	*	0.0169	*
Chicken	-0.0169	*	0.0000		0.0001		-0.0021	*
Fish	0.0379	*	0.0000		-0.0003		0.0048	*
Other foods	0.0027	*	0.0000		0.0000		0.0003	
Fresh pork- Regular	-0.3372	*	0.0037	*	-0.0035	*	-0.0394	*
Fresh pork- Organic	0.4183	*	-1.3317	*	0.2564	*	0.6467	*
Fresh pork- FF	-0.4941	*	0.3132	*	-1.7406	*	2.3057	*
Fresh pork- SSP	-0.2126	*	0.0307	*	0.0897	*	-0.1665	*
Bacon - Regular	-0.2999	*	-0.0001		0.0024	*	-0.0383	*
Bacon cuts - Organic	-0.1173	*	0.0000		0.0009	*	-0.0151	*
Bacon - FF	-0.3597	*	-0.0002		0.0029	*	-0.0462	*
Bacon - SSP	-0.5274	*	-0.0003		0.0043	*	-0.0669	*
Ham - Regular	0.1518	*	0.0000		-0.0011	*	0.0197	*
Ham - Organic	-0.5747	*	-0.0002		0.0043	*	-0.0750	*
Ham - FF	0.5422	*	0.0002		-0.0040	*	0.0704	*
Ham - SSP	-0.3407	*	0.0001		0.0026	*	-0.0444	*
Sausages - Regular	0.0887	*	0.0000		-0.0005		0.0115	*
Sausages - Organic	0.0307	*	0.0000		-0.0002		0.0041	*
Sausages - FF	0.0905	*	0.0000		-0.0005		0.0118	*
Sausages - SSP	0.0886	*	0.0000		-0.0005		0.0115	*

Source: Own elaboration based on Kantar Worldpanel data
FF stands for Freedom Foods and SSP stands for Specially Selected Pork.
Note: (*) Statistically significant at 5%
SIMD 2 includes all the households living in the less deprived areas

Appendix 4.3: Unconditional cross-price elasticities – SIMD2

	Bacon Regular		Bacon Organic		Bacon FF		Bacon SSP	
Beef	0.1307	*	0.0001		0.0007	*	0.0011	*
Lamb	0.7081	*	0.0008	*	0.0039	*	0.0058	*
Chicken	-0.0882	*	-0.0001		-0.0005		-0.0007	*
Fish	0.1979	*	0.0002		0.0011	*	0.0017	*
Other foods	0.0144	*	0.0000		0.0001		0.0001	
Fresh pork- Regular	-0.8055	*	-0.0009	*	-0.0043	*	-0.0068	*
Fresh pork- Organic	-0.0457	*	0.0000		-0.0003		-0.0004	
Fresh pork- FF	0.8569	*	0.0010	*	0.0047	*	0.0074	*
Fresh pork- SSP	-0.5569	*	-0.0006	*	-0.0030	*	-0.0047	*
Bacon - Regular	-0.7153	*	0.0046	*	0.0030	*	0.0015	*
Bacon cuts - Organic	1.5518	*	-1.4349	*	-0.1936	*	-0.1913	*
Bacon - FF	0.7190	*	-0.1301	*	-1.4984	*	0.0541	*
Bacon - SSP	0.2486	*	-0.1153	*	0.0478	*	-1.4182	*
Ham - Regular	-0.1619	*	-0.0002	*	-0.0009	*	-0.0013	*
Ham - Organic	0.6194	*	0.0007	*	0.0036	*	0.0051	*
Ham - FF	-0.5787	*	-0.0007	*	-0.0034	*	-0.0047	*
Ham - SSP	0.3684	*	0.0004		0.0022	*	0.0031	*
Sausages - Regular	-0.4309	*	-0.0005		-0.0025	*	-0.0034	*
Sausages - Organic	-0.1538	*	-0.0002		-0.0009	*	-0.0012	*
Sausages - FF	-0.4371	*	-0.0005		-0.0025	*	-0.0034	*
Sausages - SSP	-0.4305	*	-0.0005		-0.0025	*	-0.0034	*

Source: Own elaboration based on Kantar Worldpanel data
FF stands for Freedom Foods and SSP stands for Specially Selected Pork.
Note: (*) Statistically significant at 5%
SIMD 2 includes all the households living in the less deprived areas

Appendix 4.4: Unconditional cross-price elasticities – SIMD2

	Ham Regular		Ham Organic		Ham FF		Ham SSP	
Beef	0.0264	*	-0.0002		0.0002		0.0000	
Lamb	0.1419	*	-0.0010	*	0.0011	*	0.0000	
Chicken	-0.0177	*	0.0001		-0.0001		0.0000	
Fish	0.0396	*	-0.0003		0.0003		0.0000	
Other foods	0.0029	*	0.0000		0.0000		0.0000	
Fresh pork- Regular	0.3577	*	-0.0026	*	0.0027	*	0.0000	
Fresh pork- Organic	0.0110	*	-0.0001		0.0001		0.0000	
Fresh pork- FF	-0.3800	*	0.0028	*	-0.0028	*	0.0000	
Fresh pork- SSP	0.2500	*	-0.0019	*	0.0019	*	0.0000	
Bacon - Regular	-0.1408	*	0.0010	*	-0.0011	*	0.0000	
Bacon cuts - Organic	-0.0542	*	0.0004		-0.0004		0.0000	
Bacon - FF	-0.1794	*	0.0013	*	-0.0014	*	0.0000	
Bacon - SSP	-0.2461	*	0.0017	*	-0.0019	*	0.0000	
Ham - Regular	-0.0973	*	0.0036	*	0.0023	*	0.0003	
Ham - Organic	1.8536	*	-1.5746	*	0.0700	*	-0.0133	*
Ham - FF	1.0720	*	0.0636	*	-1.4824	*	0.0190	*
Ham - SSP	7.8657	*	-0.6162	*	0.9663	*	-8.0326	*
Sausages - Regular	-0.4175	*	0.0030	*	-0.0032	*	0.0000	
Sausages - Organic	-0.1470	*	0.0011	*	-0.0011	*	0.0000	
Sausages - FF	-0.4213	*	0.0031	*	-0.0033	*	0.0000	
Sausages - SSP	-0.4171	*	0.0030	*	-0.0032	*	0.0000	

Source: Own elaboration based on Kantar Worldpanel data
FF stands for Freedom Foods and SSP stands for Specially Selected Pork.
Note: (*) Statistically significant at 5%
SIMD 2 includes all the households living in the less deprived areas

Appendix 4.5: Unconditional cross-price elasticities – SIMD2

	Sausages Regular		Sausages Organic		Sausages FF		Sausages SSP	
Beef	0.0645	*	0.0001		0.0013	*	0.0057	*
Lamb	0.3502	*	0.0008	*	0.0068	*	0.0308	*
Chicken	-0.0436	*	-0.0001		-0.0009	*	-0.0038	*
Fish	0.0979	*	0.0002		0.0019	*	0.0086	*
Other foods	0.0071	*	0.0000		0.0001		0.0006	*
Fresh pork- Regular	0.1043	*	0.0003		0.0018	*	0.0101	*
Fresh pork- Organic	0.0051	*	0.0000		0.0001		0.0005	
Fresh pork- FF	-0.1017	*	-0.0003		-0.0017	*	-0.0099	*
Fresh pork- SSP	0.0725	*	0.0002		0.0012	*	0.0070	*
Bacon - Regular	-0.1963	*	-0.0004		-0.0040	*	-0.0168	*
Bacon cuts - Organic	-0.0753	*	-0.0002		-0.0015	*	-0.0064	*
Bacon - FF	-0.2359	*	-0.0005		-0.0048	*	-0.0201	*
Bacon - SSP	-0.3441	*	-0.0007	*	-0.0070	*	-0.0294	*
Ham - Regular	-0.2149	*	-0.0005	*	-0.0041	*	-0.0194	*
Ham - Organic	0.8206	*	0.0019	*	0.0155	*	0.0739	*
Ham - FF	-0.7752	*	-0.0018	*	-0.0146	*	-0.0698	*
Ham - SSP	0.4703	*	0.0012	*	0.0089	*	0.0424	*
Sausages - Regular	-0.8013	*	0.0048	*	0.0040	*	0.0197	*
Sausages - Organic	0.6873	*	-1.0365	*	0.0158	*	0.0600	*
Sausages - FF	0.2378	*	0.0060	*	-1.0444	*	0.0191	*
Sausages - SSP	0.2010	*	0.0045	*	0.0032	*	-0.9808	*

Source: Own elaboration based on Kantar Worldpanel data
FF stands for Freedom Foods and SSP stands for Specially Selected Pork.
Note: (*) Statistically significant at 5%
SIMD 2 includes all the households living in the less deprived areas

Appendix 5: Unconditional expenditure elasticities

	SIMD1		SIMD2	
Beef	1.2764	*	0.6199	*
Lamb	2.2307	*	1.6316	*
Chicken	0.8433	*	0.5850	*
Fish	-0.3983	*	0.0335	*
Other foods	0.7116	*	-0.6214	*
Fresh pork- Regular	1.4729	*	0.4006	*
Fresh pork- Organic	1.0933	*	1.1383	*
Fresh pork- FF	-1.0359	*	0.4367	*
Fresh pork- SSP	1.6358	*	1.3871	*
Bacon - Regular	2.7604	*	1.9949	*
Bacon cuts - Organic	0.1763	*	0.2637	*
Bacon - FF	0.4736	*	-1.0065	*
Bacon - SSP	0.9726	*	0.9504	*
Ham - Regular	-1.0445	*	-0.5563	*
Ham - Organic	1.1539	*	1.2429	*
Ham - FF	1.0136	*	0.4424	*
Ham - SSP	0.9785	*	1.2562	*
Sausages - Regular	1.1476	*	1.2416	*
Sausages - Organic	1.0617	*	1.2223	*
Sausages - FF	0.9968	*	0.6348	*
Sausages - SSP	0.9953	*	1.0176	*

Source: Own elaboration based on Kantar Worldpanel data
FF stands for Freedom Foods and SSP stands for Specially Selected Pork.
Note: (*) Statistically significant at 5%
SIMD 1 includes all the households living in the more deprived areas.
SIMD 2 includes all the households living in the less deprived areas.